Update: Groundwater Treatment Plant Operations and Maintenance
Quality Assurance Project Plan
Wyckoff/Eagle Harbor Superfund Site

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The purpose of this memorandum is to update the existing Quality Assurance Project Plan (QAPP) for Operation and Maintenance of the Groundwater Treatment Plant at the Wyckoff/Eagle Harbor Site, in Bainbridge Island, Washington. The current groundwater treatment system is being replaced with a new system that is configured differently from the current system. Consequently, the sample locations and target analytes identified in the QAPP for performance and compliance monitoring are no longer valid and need to be updated. The new groundwater treatment plant is scheduled to go online in July 2008.

The update to the QAPP consists of tables to replace Tables B-1 through B-13 in the current QAPP and a process flow diagram, which indicates the locations of the different sampling ports and monitoring stations on the new Groundwater Treatment Plant. Please note that additional sampling and analysis requirements, which will be applicable only during start-up of the Groundwater Treatment Plant, are called out in Table B-2. The remainder of the QAPP, including the text, figures and attachments, has not been updated.

It is assumed that this QAPP revision will be used in the interim and that a new QAPP will be prepared as part of the new GWTP operations contract in the near future.

Table B-1
Performance and Compliance Monitoring Sample Location Descriptions

Sample Location	Location Number[1]	EPA Sample ID No.	Sample Location Description
Plant Influent (PLI)	SP-0		Equalization Tank Influent
DAF Influent (DI)	SP-1		Equalization Tank Effluent
DAF Effluent (DE)	SP-2		Filter Feed Pump Effluent
Filter Influent (FI)	SP-3		Hydromation Filter Influent
Filter Effluent (FE)	SP-4		Hydromation Filter Effluent
GAC Effluent (GAC A)	SP-5		Lead GAC Effluent
GAC Effluent (GAC B)	SP-6		Second GAC Effluent
GAC Effluent (GAC C)	SP-7		Third GAC Effluent, if applicable
GAC Effluent (GAC D)	SP-8		Fourth GAC Effluent, if applicable
GAC Effluent (GAC E)	SP-9		Lag GAC Effluent
Effluent Tank (PLE)	SP-10		Effluent Tank Influent
Plant Effluent (PLE/Outfall)	SP-11		Effluent Tank Effluent & Composite Sampler
Froth Influent (FRI)	SP-12		DAF Waste / Froth Tank Influent
Froth Effluent (FRE)	SP-13		Decant Pump Effluent
Non-Aqueous Phase Liquid (NAPL)	SP-14		Froth Tank NAPL Recovery
Backwash Effluent / Forward Flush Effluent 1 (BWE/FFE 1)	SP-15		Hydromation Filter BWE/FFE
Backwash Effluent / Forward Flush Effluent 2 (BWE/FFE 2)	SP-16		GAC BWE/FFE
Backwash Recycle (BWR)	SP-17		Dirty Backwash Tank Water Recovery
Stormwater (STW)	SP-18		Stormwater/Recycle Tank Effluent

[1]Sample locations are shown on the attached Process Flow Diagram

Table B-2
Performance Monitoring Sampling Schedule

Sample Location	Location Number	Parameter	Analysis Performed at On-Site Laboratory or by Field Measurement	Analysis Performed at Manchester Environmental Laboratory
Plant Influent (PLI)	SP-0	O&G		Weekly
		PAH		Weekly
		PCP		Weekly
DAF Influent (DI) [1]	SP-1	O&G		Weekly
		TSS	Weekly	
DAF Effluent (DE) [1]	SP-2	O&G		Weekly
		TSS	Weekly	
Filter Influent (FI)	SP-3	O&G		As needed
		TSS	As needed	
Filter Effluent (FE)	SP-4	O&G		Weekly
		PAHs		Weekly
		PCP		Weekly
		TSS	Weekly	
GAC Effluent (GAC A)	SP-5	PAHs		Weekly
		PCP		Weekly
		O&G		Weekly, during start-up performance test only
GAC Effluent (GAC B)	SP-6	PAHs		Weekly
		PCP		Weekly
		O&G		Weekly, during start-up performance test only
GAC Effluent (GAC C)	SP-7	PAHs		As needed
		PCP		As needed
		O&G		As needed
GAC Effluent (GAC D)	SP-8	PAHs		As needed
		PCP		As needed
		O&G		As needed
GAC Effluent (GAC E)	SP-9	PAHs		Weekly
		PCP		Weekly

Table B-2
Performance Monitoring Sampling Schedule

Sample Location	Location Number	Parameter	Analysis Performed at On-Site Laboratory or by Field Measurement	Analysis Performed at Manchester Environmental Laboratory
		O&G		Weekly, during start-up performance test only
Effluent Tank (PLE)	SP-10	PAH		As Needed
		PCP		As Needed
Froth Influent (FRI)	SP-12	O&G		As Needed
Froth Effluent (FRE)	SP-13	O&G		As Needed
Non-Aqueous Phase Liquid (NAPL)	SP-14	Volume	As Needed	
Backwash Effluent / Forward Flush Effluent 1 (BWE/FFE 1)	SP-15	O&G		As Needed
		TSS	As Needed	
Backwash Effluent / Forward Flush Effluent 2 (BWE/FFE 2)	SP-16	O&G		As Needed
		TSS	As Needed	
Backwash Recycle (BWR)	SP-17	O&G		As Needed
		TSS	As Needed	
Stormwater (STW)	SP-18	O&G		As Needed
		PAHs		As Needed
		PCP		As Needed

[1] In addition, 5 daily composite samples will be collected and analyzed at this sample location during the treatment plant startup performance test. Both TSS and O&G analyses will be performed by Manchester Environmental Laboratory during this time. See table B-7 for TSS sample handling requirements

Key to parameters
PAH = polycyclic aromatic hydrocarbons
PCP = pentachlorophenol
TSS = total suspended solids
O&G = oil and grease
Volume = quantity of NAPL product collected in product tank

Table B-3
Number and Type of Aeration Basin Performance Monitoring Samples

Parameter	On or Offsite Laboratory	Total Number of Samples per Week
Table No Longer Required – No Aeration Basin		

Table B-4
Sample Handling Requirements for Performance Monitoring

Analysis	Method	Container	Sample Preservation	Holding Time
Oil & Grease	EPA 1664	1-liter glass	Cool to 4 ± 2°C; H_2SO_4 to pH<2	28 days
Pentachlorophenol	EPA 8041	1-liter amber glass w/ teflon-lined cap	Cool to 4 ± 2°C	7 days to extract/ 40 days to analyze
Polycyclic Aromatic Hydrocarbons	EPA 8270D	1-liter amber glass w/ teflon-lined cap	Cool to 4 ± 2°C	7 days to extract/ 40 days to analyze
Total Suspended Solids	2540B	1-liter HDPE bottle	Cool to 4 ± 2°C	7 days

HDPE = high density polypropylene

Table B-5
Chemical Compliance Monitoring Sampling Schedule

Sample Location	Location Number[1]	Parameter	Analysis Performed at On-Site Laboratory or by Field Measurement	Analysis Performed at Manchester Environmental Laboratory
Plant Effluent (PLE/Outfall)	SP-11	pH	Weekly	
		Temp	Weekly	
		PAHs		Weekly
		PCP		Weekly
		TDS		Weekly
		TSS		Weekly

DO = dissolved oxygen
HDPE = high density polypropylene
pH = hydrogen ion
PCP = pentachlorophenol
PAHs = polycyclic aromatic hydrocarbons
TDS = total dissolved solids
TSS = total suspended solids
Temp = temperature

Table B-6
Chemical Compliance Monitoring – Automated Composite Sample Volumes (SP-11)

Sample Type	Containers	Volume (gallons)
Original sample (PAH, PCP, TSS, TDS)	Two 1-liter amber glass jars; 2 1-liter HDPE containers	1.06
Field duplicate – collected once every four weeks	Same as above	1.06
Field blank/MS/MSD – collected once every four weeks	Same as above x 3 (No MS/MSD for TSS or TDS)	2.12

PAH = polycyclic aromatic hydrocarbons
PCP = pentachlorophenol
TSS = total suspended solids
TDS = total dissolved solids
MS = matrix spike
MSD = matrix spike duplicate

Table B-7
Sample Handling Requirements for Chemical Compliance Monitoring

Analysis	Method	Container	Sample Preservation	Holding Time
Pentachlorophenol	EPA 8041	1-liter amber glass w/ teflon-lined cap	Cool to 4 ± 2°C	7 days to extract/ 40 days to analyze
Polycyclic Aromatic Hydrocarbons	EPA 8270D	1-liter amber glass w/ teflon-lined cap	Cool to 4 ± 2°C	7 days to extract/ 40 days to analyze
Total Dissolved Solids	I-1750	1 liter HDPE bottle	Cool to 4 ± 2°C	7 days
Total Suspended Solids	I-3765	1 liter HDPE bottle	Cool to 4 ± 2°C	7 days

HDPE = high density polypropylene

Table B-8
Biological Compliance Monitoring Analytical Requirements

Organism	**Test Protocol**	**QA Protocol**
Acute Toxicity		
Estuarine Fish: *-Menidia beryyllina* (Inland Silversides)	The test protocol is adapted from C.I. Weber, et al., *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*, EPA/600/4-90/027, 1991.	All QA criteria used are in accordance with *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*, EPA/600/4-90/027. Test results that are not valid (i.e. control mortality exceeds acceptable levels) will not be accepted and must be repeated.
Chronic Toxicity		
Mussels/Oysters: *Mytilus* Sp. (blue mussel) or *Crassostrea gigas* (Pacific oyster)	*Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Saltwater Bivalve Molluscs*, ASTM E 724-89	*Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms,* EPA/4-85-013, Quality Assurance for Biological Testing, EPA/600/4-78-043, and *Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Saltwater Bivalve Molluscs*, ASTM E 724-89. Test results that are not valid (i.e. control mortality exceeds acceptable levels) will not be accepted and must be repeated.

Table B-9
Biological Compliance Monitoring Sample Handling Requirements

Organism	**Sample Type**	**Container**	**Preservation**	**Holding Time**
Estuarine Fish (*Menidia beryyllina)*	Composite	2-2.5 gallon HDPE cubitainers with poly lined caps	Cool to 4 ± 2°C	As soon as possible, 36 hours maximum
Mussel/oyster (*Mytilus* Sp. or *Crassostrea gigas)*	Composite	1- 1 liter HDPE cube container w/ poly lined cap	Cool to 4 ± 2°C	As soon as possible, 36 hours maximum

Table B-10
On-site GWTP Laboratory Analytical Methods and Measurement Quality Objectives

Target Analyte	Analytical Method	Required Sensitivity	Method Reporting Limit	Accuracy Goal	Precision Goal
Total Suspended Solids	2540B	± 1 mg/L	4 mg/L	75 -125	± 25

Table B-11
EPA Manchester Laboratory Analytical Methods and Measurement Quality Objectives

Target Analyte	Analytical Method	Required Sensitivity	Method Reporting Limit	Accuracy Goal	Precision Goal
PAHs: Acenaphthene Acenaphthylene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(a)fluoranthene Benzo(g,h,I)perylene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluoranthene Fluorene Indeno(1,2,3)pyrene Naphthalene Phenanthrene Pyrene	SW-846 Method 8270D	1 ug/L	1 ug/L	65 - 135	± 35
PCP	SW-846 8041	0.1 ug/L	0.1 ug/L	65 - 135	± 35
Oil and Grease	1664	5 mg/L	5 mg/L	65 -135	± 35
TDS	I-1750	NA	20 mg/L	75 -125	± 25
TSS	I-3765	NA	2 mg/L	75 -125	± 25

PAH = polycyclic aromatic hydrocarbons
PCP = pentachlorophenol
TSS = total suspended solids
TDS = total dissolved solids

Table B-12
GWTP Effluent Chemical Compliance Monitoring, Biomonitoring Toxicity Tests[a]
Analytical Methods and Measurement Quality Objectives

Criteria Type	**Estuarine Fish (*Menidia beryyllina)***	**Mussel/oyster (*Mytilus* Sp. or *Crassostrea gigas)***
Control Response	Control survival must be >90 percent at the termination of the test.	The mean survival of normal larvae must be >70 percent for oysters (or >50 percent for mussels) and the percent abnormal must be 10 percent for oysters (and <10 percent for mussels)
pH	pH must be adjusted to 8.0	pH must be >6 and <9 for both species (not to be adjusted).
Dissolved Oxygen	Dissolved oxygen concentration must be >60 percent of saturation in all test vessels at the termination of the test.	Dissolved oxygen concentration must be greater than or equal to 60 percent of saturation at test initiation in all test vessels.
Temperature	Temperature must be 20 +1◦C throughout the test interval.	Temperature must be 20 +1°C for oysters and 18 + 1°C for mussels throughout the test interval.
Reference Toxicants	Response to reference toxicant from concurrent testing must be acceptable. Reference toxicant is copper sulfate.	Response to reference toxicant from concurrent testing must be acceptable. Reference toxicant is cadmium chloride.

[a]Established toxicity test criteria are included as part of the test protocols.

Table B-13
GWTP Effluent Chemical Compliance Monitoring, Biomonitoring Toxicity Tests[a]
Field Quality Control Sample Frequency

Target Analyte	**Field Duplicates**	**Matrix Spike/Matrix Spike Duplicates**
PAHs	1 every 4 weeks for effluent	1 every 4 weeks for effluent
PCP	1 every 4 weeks for effluent	1 every 4 weeks for effluent
Total Dissolved Solids	1 every 4 weeks for effluent	Not applicable
Total Suspended Solids	1 every 4 weeks for effluent	Not applicable
Toxicity Test – Estuarine Fish	Not applicable	Not applicable
Toxicity Test – Mussels/Oysters	Not applicable	Not applicable